Amendments to the Claims

The following Listing of Claims replaces all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (currently amended): A machine-implemented method of processing a sequence of image frames, comprising:

computing respective sets of motion vectors for pairs of the image frames;

classifying the computed motion vectors into motion classes;

identifying motion clusters in the image frames based at least in part on the motion classes; ~~and~~

determining for each of the identified motion clusters a respective spatiotemporal consistency value indicating persistence of the motion cluster in a respective spatial region across neighboring ones of the image frames;

selecting ~~an~~one of the identified motion clusters as a motion stabilization reference based on the spatiotemporal consistency ~~of the selected motion cluster across multiple image frames~~values;

determining a motion model describing motion of the motion stabilization reference in the image frame sequence; and

producing a motion-stabilized version of the sequence of image frames based on the motion model.

Claim 2 (currently amended): The method of claim 1, wherein the computing ~~motion vectors~~ comprises generating for pairs of the image frames respective dense motion models describing motion at pixel locations with respective sets of parameter values in a motion parameter space.

Claim 3 (currently amended): The method of claim 2, wherein the identifying ~~motion clusters~~ comprises iteratively clustering ones of the motion vectors from a coarse image frame resolution level to a fine image frame resolution level.

Claim 4 (currently amended): The method of claim 3, wherein at each image frame resolution level ones of the motion vectors are classified into motion clusters, and a respective one of the spatiotemporal consistency values is determined for each of the clusters identified in a given image frame based on a projection of the motion cluster into a neighboring image frame using computed inter-frame motion.

Claim 5 (currently amended): The method of claim 4, wherein each of the respective spatiotemporal consistency values is determined based on degree of overlap between ~~a~~the respective motion cluster projected from the given image frame and a corresponding one of the motion clusters identified in ~~a~~ the neighboring image frame.

Claim 6 (currently amended): The method of claim 4, wherein ones of the motion vectors are re-classified with a modified clustering parameter in response to a determination that ~~a computed~~the respective spatiotemporal consistency ~~measure is~~values are below a consistency threshold.

Claim 7 (original): The method of claim 3, wherein motion vectors are clustered iteratively in accordance with a clustering method.

Claim 8 (currently amended): The method of claim 1, wherein the selecting ~~a motion cluster as a motion stabilization reference~~ comprises projecting each motion cluster from image frames to respective neighboring image frames, and computing respective measures of spatiotemporal consistency for the projected motion clusters.

Claim 9 (currently amended): The method of claim 1, wherein the selecting comprises selecting ~~motion cluster selected~~ as ~~a~~ the motion stabilization reference for a given reference image frame the motion cluster having ~~has~~ a greater spatiotemporal consistency ~~measure~~ value than the spatiotemporal consistency values of other ones of the motion clusters across multiple image frames neighboring the given reference image frame.

Claim 10 (canceled)

Claim 11 (currently amended): A system for processing a sequence of image frames, comprising:

a motion estimation module configured to compute respective sets of motion vectors for pairs of image frames;

a motion classification module configured to classify the computed motion vectors into motion classes;

a motion-based spatial clustering module configured to

identify motion clusters in the image frames based at least in part on the motion classes, and

determine for each of the identified motion clusters a respective spatiotemporal consistency value indicating persistence of the motion cluster in a respective spatial region across neighboring ones of the image frames; ~~and~~

a motion stabilization reference selection module configured to select ~~an~~one of the identified motion clusters as a motion stabilization reference based on the spatiotemporal consistency values~~of the selected motion cluster across multiple image frames~~; and

a motion stabilization module configured to

determine a motion model describing motion of the motion stabilization reference in the image frame sequence, and

produce a motion-stabilized version of the sequence of image frames based on the motion model.

Claim 12 (currently amended): The system of claim 11, wherein the motion estimation module is configured to compute motion vectors by generating for pairs of the image frames respective dense motion models describing motion at pixel locations with respective sets of parameter values in a motion parameter space.

Claim 13 (currently amended): The system of claim 12, wherein the motion-based spatial clustering module is configured to identify motion clusters by iteratively clustering ones of the motion vectors from a coarse image frame resolution level to a fine image frame resolution level.

Claim 14 (currently amended): The system of claim 13, wherein at each image frame resolution level ones of the motion vectors are classified by the motion classification module into motion clusters, and a respective one of the spatiotemporal consistency values is determined for each of the clusters in a given image frame based on a projection of the motion cluster into a neighboring image frame using computed inter-frame motion.

Claim 15 (currently amended): The system of claim 14, wherein each of the respective spatiotemporal consistency values is determined based on degree of overlap between ~~a~~the respective motion cluster projected from the given image frame and a corresponding one of the motion clusters identified in ~~a~~ the neighboring image frame.

Claim 16 (currently amended): The system of claim 14, wherein the motion classification module re-classifies ones of the motion vectors with a modified clustering parameter in response to a determination that ~~a computed~~the respective spatiotemporal consistency ~~measure is~~values are below a consistency threshold.

Claim 17 (original): The system of claim 13, wherein the motion classification module clusters motion vectors iteratively in accordance with a clustering method.

Claim 18 (currently amended): The system of claim 11, wherein the motion stabilization reference selection module selects a motion cluster as ~~a~~ the motion stabilization reference by projecting each motion cluster from image frames to respective neighboring image frames and computing respective measures of spatiotemporal consistency for the projected motion clusters.

Claim 19 (currently amended): The system of claim 11, wherein the motion stabilization reference selection module selects as ~~a~~ the motion stabilization reference for a given reference image frame the motion cluster having a greater spatiotemporal consistency ~~measure~~ value than the spatiotemporal consistency values of other ones of the motion clusters across multiple image frames neighboring the given reference image frame.

Claim 20 (canceled)

Claim 21 (currently amended): A machine-readable medium storing machine-readable instructions for causing a machine to perform operations comprising:

~~compute~~ computing respective sets of motion vectors for pairs of image frames;

~~classify~~ classifying the computed motion vectors into motion classes;

identifying motion clusters in the image frames based at least in part on the motion classes; ~~and~~

determining for each of the identified motion clusters a respective spatiotemporal consistency value indicating persistence of the motion cluster in a respective spatial region across neighboring ones of the image frames;

~~select~~ selecting one of the~~an~~ identified motion clusters as a motion stabilization reference based on the spatiotemporal consistency ~~of the selected motion cluster across multiple image frames~~values;

determining a motion model describing motion of the motion stabilization reference in the image frame sequence; and

producing a motion-stabilized version of the sequence of image frames based on the motion model.

Claim 22 (original): The machine-readable medium of claim 21, wherein the machine-readable instructions cause the machine to compute motion vectors by generating for pairs of the image frames respective dense motion models describing motion at pixel locations with respective sets of parameter values in a motion parameter space.

Claim 23 (original): The machine-readable medium of claim 22, wherein the machine-readable instructions cause the machine to identify motion clusters by iteratively clustering ones of the motion vectors from a coarse image frame resolution level to a fine image frame resolution level.

Claim 24 (original): The machine-readable medium of claim 23, wherein at each image frame resolution level ones of the motion vectors are classified into motion clusters, and a respective one of the spatiotemporal consistency values is determined for each of the

clusters in a given image frame based on a projection of the motion cluster into a neighboring image frame using computed inter-frame motion.

Claim 25 (currently amended): The machine-readable medium of claim 24, wherein each of the respective spatiotemporal consistency values is determined based on degree of overlap between ~~a~~ the respective motion cluster projected from the given image frame and a corresponding one of the motion clusters identified in ~~a~~the neighboring image frame.

Claim 26 (original): The machine-readable medium of claim 24, wherein the machine-readable instructions cause the machine to re-classify ones of the motion vectors with a modified clustering parameter in response to a determination that ~~a computed~~the respective spatiotemporal consistency ~~measure is~~values are below a consistency threshold.

Claim 27 (original): The machine-readable medium of claim 23, wherein the machine-readable instructions cause the machine to cluster motion vectors iteratively in accordance with a clustering method.

Claim 28 (currently amended): The machine-readable medium of claim 21, wherein the machine-readable instructions cause the machine to select a motion cluster as ~~a~~ the motion stabilization reference by projecting each motion cluster from image frames to respective neighboring image frames and computing respective measures of spatiotemporal consistency for the projected motion clusters.

Claim 29 (currently amended): The machine-readable medium of claim 21, wherein the machine-readable instructions cause the machine to select as ~~a~~ the motion stabilization reference for a given reference image frame the motion cluster having a greater spatiotemporal consistency ~~measure~~ value than the spatiotemporal consistency values of other ones of the motion clusters across multiple image frames neighboring the given reference image frame.

Claim 30 (canceled)